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Tetranchyroderma sardum, a new species of the family Thaumastodermatidae (Gastrotricha, Macrodasyida)

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ABSTRACT

Tetranchyroderma sardum, a new species of macrodasyid gastrotrich, was found in litoral sand from Sardinia. It is characterized by: 1. two pairs of cephalic tentacles, one rod-like and the other knob-like; 2. twenty-two pairs of ventrolateral adhesive tubes; 3. three furcal adhesive tubes and 4. thirteen longitudinal rows of pentancres. *T. sardum* closely resembles *T. esarabdophorum* and *T. antennatum*, both collected from the Mediterranean Sea.

KEY WORDS: Marine gastrotrichs; Macrodasyida; *Tetranchyroderma sardum* n. sp.; Mediterranean fauna.

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INTRODUCTION

The world gastrotrich fauna consists of more than 500 species, divided into two orders: Macrodasyida and Chaetonotida. To date, about fifty species of Macrodasyida and one-hundred Chaetonotida species have been reported for Italy, but these numbers will undoubtedly increase.

Interest in these microscopic metazoa has been discontinuous and has centered mainly on chaetonotids. The most recent studies on marine species in Italy were conducted by Luporini *et al.* (1970) and Schrom (1972). Studies on fresh-water species appeared a few years later (Balsamo, 1977). This research led to a remarkable lengthening of the list of the species known for Italy. Here we describe a new species, thereby adding a contribution to the knowledge of the Italian gastrotrichologic fauna.

The new species belongs to *Tetranchyroderma* genus and it was found in a coarse sand sample collected in July 1987 from the beach of Cala Liberotto of Orosei (Nuoro) on the eastern coast of Sardinia (40° 26' N; 9° 50' E). It was named *T. sardum*, where «*sardum*» means «living in Sardinia».

MATERIAL AND METHODS

Nineteen specimens were observed, measured, and photographed *in vivo*. Permanent slides were not made because many of the characteristics useful for the specific identification were no longer visible in preserved specimens. Photographic negatives of some specimens have been deposited, as species type and paratypes, at the «Museo Civico di Storia Naturale» of Verona (Lungadige Porta Vittoria 9, 37100 - Verona, Italy).

Fauna associated with *T. sardum* included numerous specimens of a chaetonotid that was identified as *Heteroxenotrichula pygmaea* (Remane, 1935).

DIAGNOSIS

Tetranchyroderma 258-358 μm long; 13 longitudinal rows of pentancres. Cephalic appendices represented by one pair of dorsal rod-like tentacles and one pair of lateral knob-like tentacles. Eight post-oral adhesive tubes, 22 pairs of ventrolateral adhesive tubes and one pair of intrafurcal adhesive tubes. Three adhesive tubes on each furcal foot. One testis on the right body side.

DESCRIPTION

The sexually mature specimens show a total length of 258-358 μm, and a total width, measured about halfway through the trunk of 42-53 μm (Fig. 1).

Except for the most anterior part of the head, the dorsal and the lateral body surface is covered by pentancres bearing branches of equal length (Fig. 2A, 3). The pentancres are arranged in 13 longitudinal rows, each consisting of about 53 pentancres. Those inserted in the medial region of the trunk measure 3.4-3.7 μm, while those over the anterior part of the cephalic re-

gion, and over the base of the caudal feet are smaller, measuring only 2-3 μm.

The mouth is wide, funnel-shaped, and opens ventrally, like that of the other species of the genus. 10-12 bristles, 5.5-7.6 μm long, are implanted on the anterior edge of the mouth. A similar number of bristles, 3.5-5.0 μm long, are implanted on its posterior edge (Figs. 1A, B).

Two rod-like tentacles, 12.5-15.9 μm long, emerge from the frontal part of the head and two knob-like tentacles, 8.5-11.32 μm in length and 4.9-5.0 μm in width, are implanted slightly posteriorly and ventro-laterally to the mouth. A bristle emerges anteriorly and dorsally to each knob-like tentacle; it is longer (11.4-15.0 μm) and stiffer than those surrounding the oral basket.

A transverse series of eight adhesive tubes lies posteriorly to the mouth, about at the level of the knob-like tentacles (Fig. 1B). The four medial tubes are subconical and 8.9-9.7 μm long, whereas the two lateral pairs are cylindrical.

From 15 to 22 pairs of adhesive tubes, 10-16 μm long, are present on the ventro-lateral margins of the body, depending on the animal size. The first pair is isolated and situated at the level of the anterior third of the pharynx. The second pair is inserted near the pharyngo-intestinal junction. The last three pairs are clearly set apart from the others, at the level of the intestine end.

An additional pair of adhesive tubes, 10 μm long, is inserted on the internal side of each caudal foot.

The caudal feet are 13.5-17.8 μm long and terminate with three adhesive tubes, two of which are ventral and 7 μm long, and one is dorsal and 4 μm long.

About 15 bristles, 8.8-11.4 μm long, can be observed on each body side together with seven or eight pairs of large epidermic glands (6.5-8.0 μm in diameter) containing a highly refractive secretion.

The ventral body surface is covered by cilia arranged in transversal rows and does not appear to bear cuticular structures.

The mouth opens into a cylindrical pharynx, which extends a little more than one-third of the total length of the digestive tract. Pharyngeal pores were not observed.

The single testis is located on the right side of the body, lateral to the intestine. It is usually filled with very long spermatozoa.

A fronto-caudal organ, similar in shape to that described in other species of the genus, is situated dorsally to the intestine and it is visible at the level of the last three pairs of epidermic glands. Both frontal and caudal portions are well developed and evident (Figs. 1A, 3).

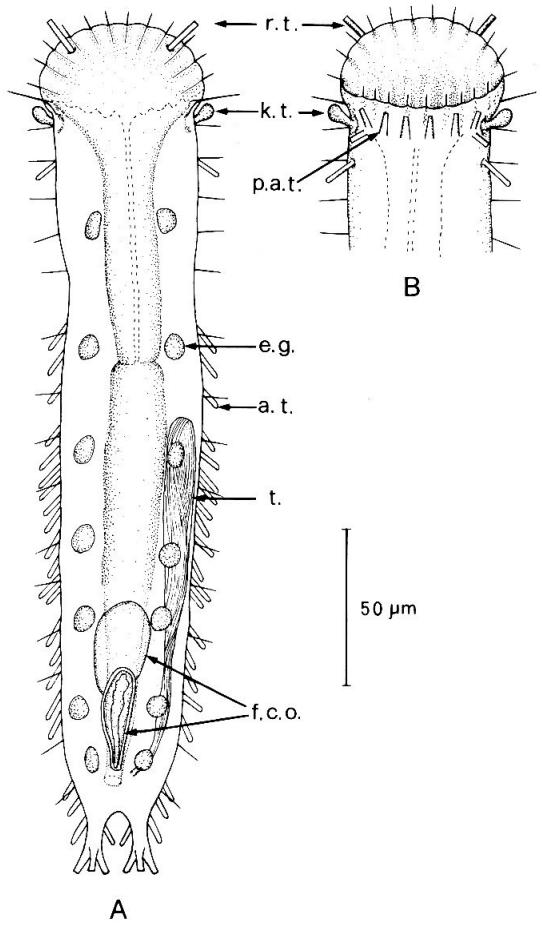

Fig. 1 - *Tetranchyroderma sardum* n. sp. A: dorsal view. B: ventral view of the head. Abbreviations: a.t., adhesive tubes; e.g., epidermic glands; f.c.o., fronto-caudal organ; k.t., knob-like tentacles; p.a.t., post-oral adhesive tubes; r.t., rod-like tentacles; t., testis.

TAXONOMIC AFFINITIES

The genus *Tetranchyroderma* includes 32 species, seven of which described but not named by Schrom (1972) and by Valbonesi & Luporini (1984).

Fifteen of these species show pentancre-type spines similar to *T. sardum*. Among these, however, *T. paradoxa* Thane-Fenchel (1970) bears triancres and tetrancres in addition to pentancres. Ten other species, differently from *T. sardum*, show only one pair of cephalic tentacles, either dorsal and rod-shaped, or ventro-lateral and club- or knob-shaped. Both these types of tentacles are shown only by *T. papii* Gerlach (1953), *T. antennatum* Luporini *et al.* (1970), *T. enallosa* Hummon (1977), and *T. esarabdophorum* Tongiorgi & Balsamo (1984). Therefore, the closest morphological

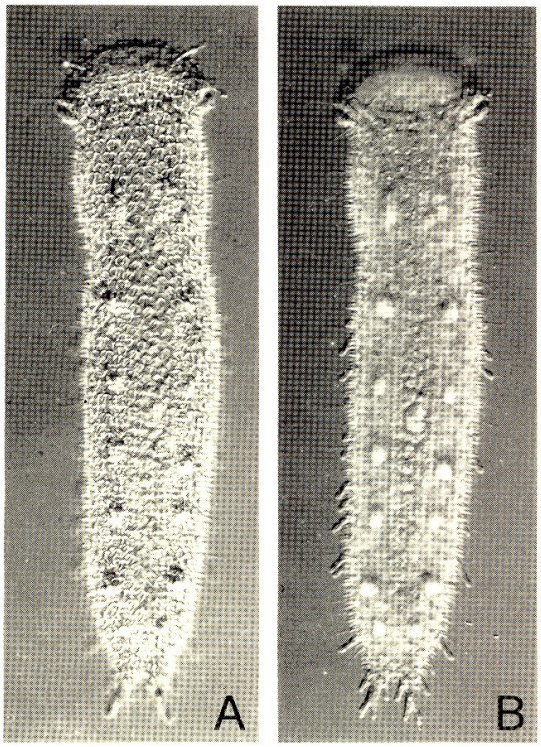

Fig. 2 - *Tetranchyroderma sardum* n. sp. Adult specimen. A: dorsal view (Nomarski optics, × 410). B: ventral view (Nomarski optics, × 410).

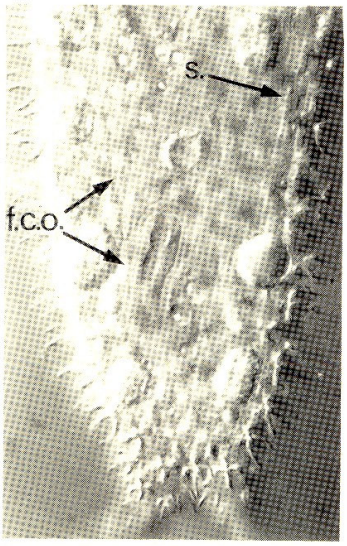

Fig. 3 - *Tetranchyroderma sardum* n. sp. (Nomarski optics, × 820). Abbreviations: f.c.o., fronto-caudal organ; s., spermatozoa.

similarity of *T. sardum* seems to be with those last four species.

Tetranchyroderma papii clearly differs from *T. sardum* for the remarkably longer ventro-lateral finger-like tentacles (32 μm vs. 8.5-11.3 μm). *T. enallosa* has half as many ventrolateral adhesive tubes as *T. sardum* (11 vs. 22). Moreover, it has only one pair of postoral adhesive tubes, two pairs (instead of one) adhesive tubes between the caudal feet, and four pairs of dorsal adhesive tubes which are absent from *T. sardum*. *T. esarabdophorum* can be distinguished from *T. sardum* by a higher number of longitudinal rows of pentancres (19-20 vs. 13), by the smaller number of pentancres per row (43-45 vs. 53) and by the presence of three pairs of dorsal rod-like processes. Lastly, *T. antennatum* differs from *T. sardum* because of a lower number of pentancres per row (45 vs. 53), the presence of two ventral adhesive tubes located at the level of the 18th pair of lateral tubes, the apparent lack of a fronto-caudal organ (referred as bursa copulatrix in the original description of *T. antennatum*), and the presence of two (instead of three) adhesive tubes on each caudal foot. With regard to this last trait it is worth noting that *T. hystrix antennata* (d'Hondt, 1968), considered by Luporini *et al.* (1970) synonym of *T. antennatum*, has been reported to have three adhesive tubes on each foot similar to *T. sardum*.

Tetranchyroderma sardum differs from *T. esarabdophorum* and *T. antennatum* in only a few characters, but these are very constant in all specimens examined. No specimens of the other two species have been found in the same sample. This excludes that *T. sardum* is the result of an introgressive hybridization between *T. esarabdophorum* and *T. antennatum* like that described for *T. enallosa* and *T. papii* (Hummon, 1977). These reasons justify the attribution of the Sardinian specimens to a new species.

REFERENCES

Balsamo M., 1977 - Prime ricerche sui Gastrotrichi dulciacquicoli italiani. Atti Soc. tosc. nat., Mem., ser. B., 84: 87-150.

Gerlach S.A., 1953 - Gastrotrichen aus dem Küstengrundwasser des Mittelmeeres. Zool. Anz., 150: 203-211.

d'Hondt J.L., 1968 - Contribution à la connaissance des Gastrotriches intercotidaux du golfe de Gascogne. Cah. Biol. Mar., 9: 387-404.

Hummon W.D., 1977 - Introgressive hybridization between two intertidal species of *Tetranchyroderma* (Gastrotricha, Thaumastodermatidae) with the description of a new species. Mikrofauna Meeresboden, 61: 113-136.

Luporini P., Magagnini G., Tongiorgi P., 1970 - Gastrotrichi Macrodasioidei delle coste della Toscana. Pubbl. Staz. zool. Napoli, 38: 267-288.

Remane A., 1935 - Die Gastrotrichen des Küstengrundwassers von Schilksee. Schr. Naturwiss. Ver. Schleswig - Holstein, 20 (2): 473-478.

Schrom H., 1972 - Nordadriatische Gastrotrichen. Helgoländer wiss. Meeresunters., 23: 286-351

Thane-Fenchel A., 1970 - Interstitial gastrotrichs in some South Florida beaches. Ophelia, 7: 113-138

Tongiorgi P., Balsamo M., 1984 - A new *Tetranchyroderma* species (Gastrotricha, Macrodasyoidea) from the Adriatic coast. Boll. Zool., 51: 335-338.

Valbonesi A., Luporini P., 1984 - Researches on the coast of Somalia. Gastrotricha Macrodasyoidea. Monit. Zool. Ital. (N. S.) Suppl. XIX, 1: 1-34.